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ADDENDUM TO DRAFT CLOSURE PLAN
RIDGEFIELD BRICK AND TILE SITE
RIDGEFIELD, WASHINGTON

July 15, 1983*

Introduction

This Addendum has been prepared to address comments on the subject draft closure plan contained in the August 4, 1983 letter from the Washington Department of Ecology to Pacific Wood Treating Corporation. This Addendum was prepared by Sweet, Edwards & Associates, Inc., Kelso, Washington and Patrick H. Wicks, Redmond, Washington at the request of Pacific Wood Treating Corporation.

The items that follow are modifications, additions to or deletions from the certain portions of the subject draft closure plan (and post-closure plan). Each item below is numbered to correspond to the number for each comment in the August 4, 1983 letter noted above. Those portions of the draft closure plan to which changes are proposed are also referenced below.

Closure Plan

1. As discussed at our August 17, 1983 meeting with D.O.E. and E.P.A. at the D.O.E. Southwest Regional Offices, sprinkling of the pond water is now limited to the actual pond area or directly upon the adjacent refuse. At the present time, almost all water has been evapotranspired as a result of the warmer weather and

*Modified August 22, 1983.

the limited pumping through sprinklers to enhance evaporation. A minimal amount of water was sprinkle irrigated on the soils to the south of the pond, however, this is the borrow area for soils which will be used in developing the liner and cap as noted in our draft closure plan.

2. Testing of on-site soils for moisture-density/permeability relationships has been completed by Foundation Engineering. Those tests indicate that the coefficient of permeability for the on-site soils is very sensitive to density. At the recommendation of Foundation Engineering, samples of the soil were submitted to American Colloid Company for testing and recommendations regarding soil amendment with bentonite. American Colloid has recommended an application of 2.5 pounds per square foot of Saline Seal 100 bentonite to achieve a 1×10^{-7} centimeter per second coefficient of permeability. It is our intent to follow this recommendation in the development of the bottom seal, see attached report and data sheets.

As recommended by Jim Maitland of Foundation Engineering, it is our intent to compact the 4-inch bentonite mixed blanket to at least 90% relative compaction (ASTMD-698) to ensure the 1×10^{-7} centimeters per second coefficient of permeability. Mr. Maitland will provide on-site inspection and testing of the relative compaction to ensure the proper placement of the blanket.

As discussed at our August 17, 1983 meeting, it is our intent to place 1.5 feet of compacted native soil over the refuse. This will be compacted in place and subsequently covered with

an additional 1.5 feet of uncompacted, but properly graded and seeded native soil. As stated in the plan, the final cover will be planted with winter rye and other appropriate seed mixes to allow maximum transpiration of infiltrating precipitation.

3. Decisions regarding the potential for, and/or control of, ground water seepage into the waste cell will necessarily require field inspection during the site preparation. If it is found that the mica sand layer provides an avenue for perched water to move into the waste cell from any of the three sides, we intend to slope a compacted soil seal up against that wall. Since the mica sand has a higher hydraulic conductivity than the compacted soils, the natural avenue for drainage will then be around the waste cell. Again, these decisions will require on-site inspection during the preparation of the bottom seal for the refuse cell.

4. On page 6, reword item 4 as follows:

   4. Move waste: Move waste and underlying contaminated soil from old disposal area to new disposal area and place according to design, sub-section C.

   On page 26, reword item 2) as follows:

   2) Place refuse and underlying contaminated soil in 0.5 to 1 foot lifts with concomitant compaction in the cell, note placement and compaction at 3:1 slope for maximum

effectiveness and preferred moisture routing control. Amount of contaminated soil to be removed will be determined by sampling and analysis, such that only soil underlying the old disposal area will remain there if pH 5 elutriates of the soil, extracted through simple funnel rinses with four time the sample weight of buffered solution, contain less than 5 mg/l arsenic (EP Toxicity limit), ~~1.010 mg/l~~ pentachlorophenol (Human Health Water Consumption limit), and 2.3 mg/l napthalene (Acute Freshwater Fish Toxicity). Although we recognize this does not strictly comply with EP Toxicity procedures, it does provide an indicator of the contamination potential of the underlying soils while not taking several days and "shutting down" the closure operation.

5. Detail III-A on page 28 of the draft closure plan was not clear in showing the relationship of the toe drain to the refuse cell. The toe drain will in fact be placed immediately adjacent to and in contact with the toe of the refuse cell to facilitate efficient collection of any leachate perching on the bottom layer and migrating to the drain, see modified Figure 11.

6. As described on page 30 of the post closure plan, it is our intent to inspect the toe drain collection system following installation to determine if significant volumes of leachate are being accumulated in the drain. We stated, "should excessive amounts or unacceptable levels of leachate contaminants be encountered, this option would allow for

collection of said leachate through the addition of a holding tank and appropriate disposal of that leachate."

On page 37, at the end of the GROUND WATER MONITORING, SAMPLING AND ANALYSIS section which begins on page 34, add the following:

The toe drain (distribution box, Option III) will be sampled and analyzed on the same schedule and for the same parameters as the lysimeters and wells. If the results of analysis of water from the toe drain exceeds the concentrations below, a 500-gallon or larger holding tank will be installed to collect water by gravity drainage from the toe drain. These concentrations are: 0.05 mg/l arsenic (Primary Drinking Water Standard), ~~0.055~~ mg/l pentachlorophenol and 2.3 mg/l napthalene (Acute Freshwater Fish Toxicity). Collected water, if above these concentrations, will be disposed in accordance with State/Federal regulations, possibly at Pacific Wood Treating Corporation's plant. Below these concentrations, this water will be allowed to drain to the ditch shown on Figure 10.

Note: The above item has been added to the post-closure plan, rather than the closure plan as suggested by the August 4 letter.

7. On page 32 in E. Certification, change "three months" to "45 days".

8. As agreed, a Closure cost estimate is not considered necessary at this time. However, a Post Closure cost is developed in the following discussion.

10. On page 6, item 5., reword the first sentence as follows: Equipment which moved waste to the new disposal area is to be cleaned by washing exposed areas with steam or a small volume of water.

Post-Closure Plan

1. On page 37, add a new section, "POST-CLOSURE PERIOD", to read as follows:
This plan shall be carried out over a period of thirty (30) years beginning at completion of closure, unless a reduction of that period is approved by the U.S. Environmental Protection Agency and Washington Department of Ecology.

On page 37, reword "MODIFICATIONS" section to read as follows: Any modifications to the post-closure period, monitoring or any other provisions of this plan will be submitted to the U.S. Environmental Protection Agency and Washington Department of Ecology in accordance with 40 CFR 265.118 (e) and (f).

2. On page 38, add a new section, "POST-CLOSURE COST ESTIMATE", to read as follows:

Costs during the post-closure period in 1983 dollars have been estimated for each year as follows:

Year 1		Annual Cost
Sampling/Inspections		2,100
Maintenance		400
Laboratory Analysis		3,540
	SUBTOTAL	6,040

Years 2 and 3		
Sampling/Inspections		600
Maintenance		400
Laboratory Analysis		510
	SUBTOTAL	1,510

Years 4 through 30		
Sampling/Inspections		600
Maintenance		200
Laboratory Analysis		510
	SUBTOTAL	1,310

The sum of these annual costs and the estimated total post-closure cost is therefore $44,430.00. → $50,000

3. On page 38, delete the "CERTIFICATION" section and in its place add a new section "NOTICE IN DEED TO PROPERTY" to read as follows:

As required by 40 CFR 265.120, a notation on the site property deed will be recorded to notify in perpetuity any potential

purchaser that the land has been used to manage hazardous waste and its use is restricted under 40 CFR 265.117(c) and this plan, provided that Pacific Wood Treating Corporation owns the property.

4. On page 33, add after item I, the following:

   J. Condition of toe drain.

   K. Condition of lysimeters/wells.

Ground Water Monitoring Plan

1. Following our extensive discussion regarding the ground water monitoring plan we propose to continue to use the background well listed in our RBT SITE PRELIMINARY GROUND WATER INVESTIGATION which is appended to the draft closure plan. That well is located approximately 3/4 of a mile east of the pit. Other wells located upgradient and in the vicinity of the pit are considered unacceptable due to locally accumulated wood wastes and/or on-going agricultural activities. The selected well is definitely outside the influence of the RBT Pit. As reported in our earlier investigations, Mundorff (1964) shows the ground water flow direction in the Troutdale formation to be towards the northwest. Two local downgradient wells shown in our earlier report (Nos. 4 and 5) are incorporated in this plan as the downgradient sampling points completed in the Troutdale formation.

Sampling of the background and two downgradient wells will be facilitated through 10 minutes of pumping to waste followed by sample collection at the hydrant nearest the well head. Although we recognize this does not comply with the strictest Quality Assurance/Quality Control program for inorganic/organic testing of aquifers, it will provide a measure of the quality of water being delivered for domestic use. This collection procedure minimizes any complicated clean up procedures during sampling. Signed agreements with each of the three well owners for sampling access are appended.

2. Toe drain and lysimeter locations were chosen to comply with the "waste management area. . . described by the waste boundry (perimeter)" under 265.91 as well as downgradient attenuation of any contamination. Specific locations have been adjusted as per the August 17, 1983 meeting agreement, see attached Figure 10. To the best of our knowledge, there is no regulation regarding the installation of lysimeters.

3a. The lysimeters proposed for this site will be installed as shown on page 17 of the draft closure plan. The holes will be advanced using a hollow stem auger and decisions regarding installation through the hollow stem or with an open hole will be made in the field. The piezometers and PVC risers shown in the draft closure plan will be press fitted or threaded joints to avoid solvent or glue contamination. The suction lysimeter body will be PVC with a porous ceramic tip (Soil Moisture Corp.) and the pressure/evacuation tubing will be dedicated at each lysimeter. Clean sand or powdered quartz will be used as the backfill material

around the lysimeter body. Pelletized bentonite will be used in the annular seal shown in the schematic diagram and samples of all PVC bentonite and/or cleaning water will be retained for future analysis as necessary.

All materials will be steam cleaned prior to placement in the borehole and the auger as well as the rear portion of the drilling rig will be steam cleaned between installation sites.

3b. One pore volume from the lysimeters or sampling port will be pumped to waste. Then, during sampling of the toe drain and the lysimeters, a system as shown on the attached Figure 14 will be employed. The dedicated tubing from the lysimeter or toe drain port will be attached to an Erlenmeyer flask. Pumping through a second tube from the flask or by pressure introduction into a second dedicated tube through the lysimeter will force the sample into the flask. If the sample is not turbid, it will then be transferred directly to the laboratory bottles. If it is found that the sample is turbid, it will be field filtered using a 0.45 micron filter as it is transferred to the laboratory bottle.

Cleanup between sites will include a detergent-distilled water-methyl alcohol-distilled water sequence of rinses for the Erlenmeyer flask.

As suggested in the draft closure plan, a chain of custody form will be completed and the samples preserved and transported as per the references shown under six (6) below.

4. On page 35, in column 1), delete "Floride" and "Coliform bacteria".

   On page 35, in column 2), delete "Manganese", "Sodium" and "Sulfate", and add "Copper", "Pentachlorophenol" and "Napthalene".

   On page 37 in column 1) reword note as follows:
   Note: Quarterly duplicate or split samples will be collected where volumes allow from background and two downgradient wells as well as the toe drain and three lysimeters. Single samples will be tested and the split held for backup verification, should significant contamination be observed.

5. As discussed in the meeting, all sampling lines from the lysimeters as well as the toe drain port, will be dedicated.

6. On page 35, reword the first paragraph as follows:
   Samples will be collected, preserved, transported and analyzed in accordance with Handbook for Sampling and Sample Preservation of Water and Wastewater (1982), Methods for Chemical Analysis of Water and Wastes (1979) and Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater (1982), and/or other regulatory direction. Chain of custody control will be assured through use of the form shown on Figure 13. Analysis will be performed at a commercial laboratory or at Pacific Wood Treating Corporation's laboratory, dependent on adequate experience and capabilities to properly analyze for the constituents noted below.

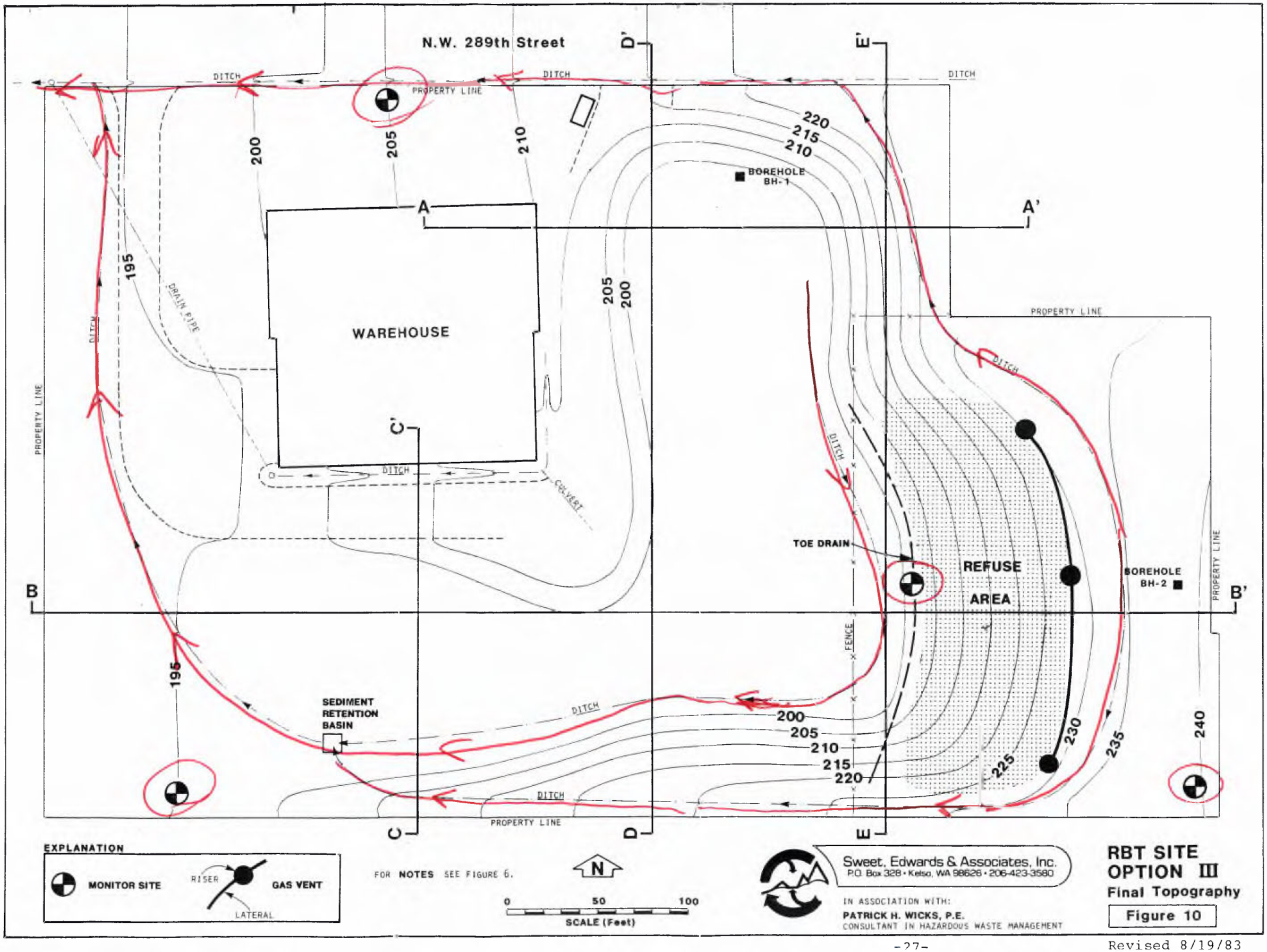
If PWT's laboratory is used, every tenth sample will be split for duplicate testing by D.O.E. and/or a commercial lab.

On page 40, delete the third reference and add the following two references:

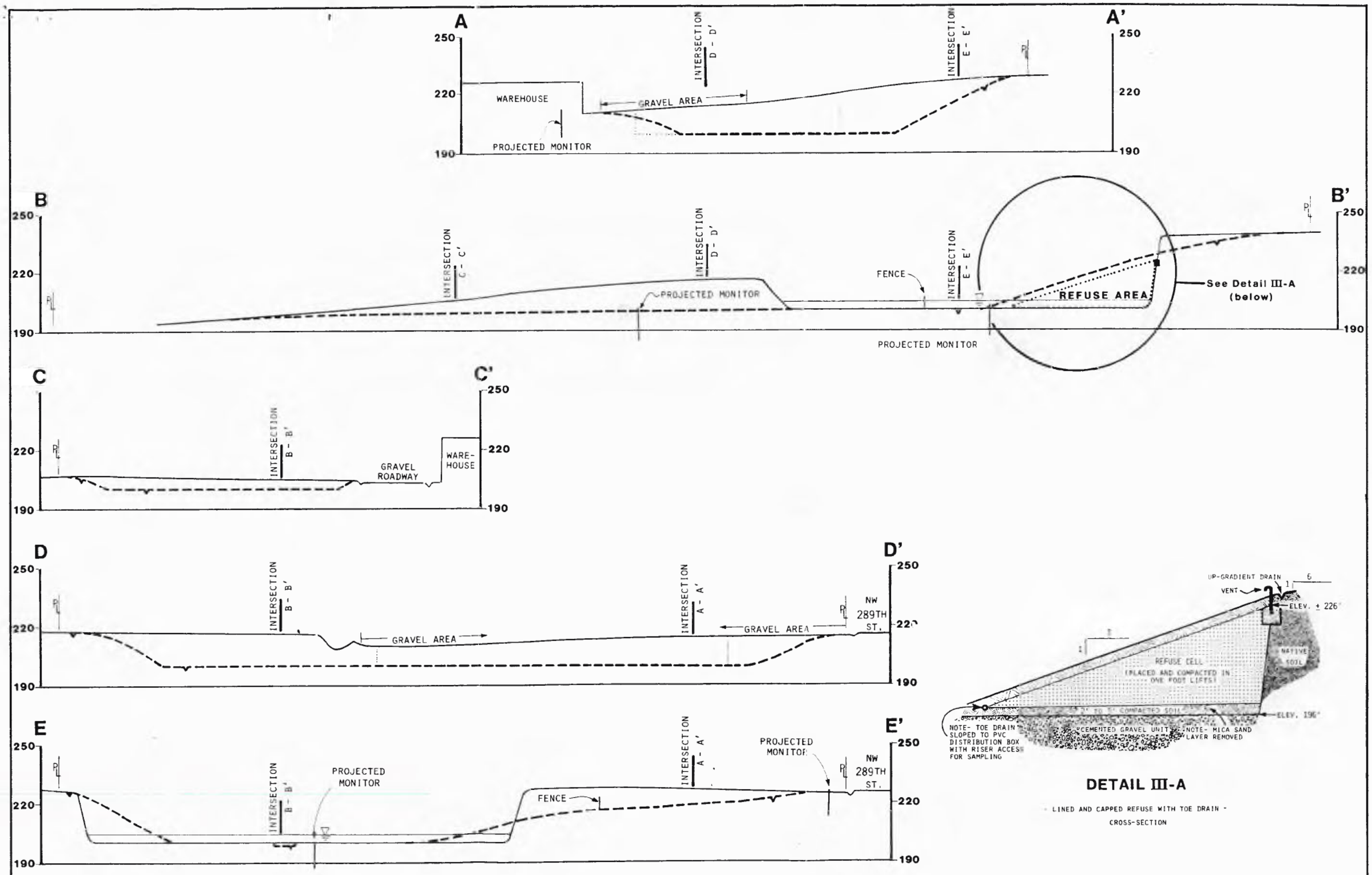
Handbook for Sampling and Sample Preservation of Water and Wastewater: EPA-600/4-82-029, September 1982.

Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater: EPA-600/4-82-057, July 1982.

MODIFIED FIGURES



Revised 8/19/83



DETAIL III-A

- LINED AND CAPPED REFUSE WITH TOE DRAIN -
CROSS-SECTION

NOTE: BOLD DASHED LINES INDICATE PROPOSED CUTS AND FILLS.

0 50 100
SCALE (Feet)

Sweet, Edwards & Associates, Inc.
P.O. Box 328 • Kelso, WA 98626 • 206-423-3580

IN ASSOCIATION WITH:
PATRICK H. WICKS, P.E.
CONSULTANT IN HAZARDOUS WASTE MANAGEMENT

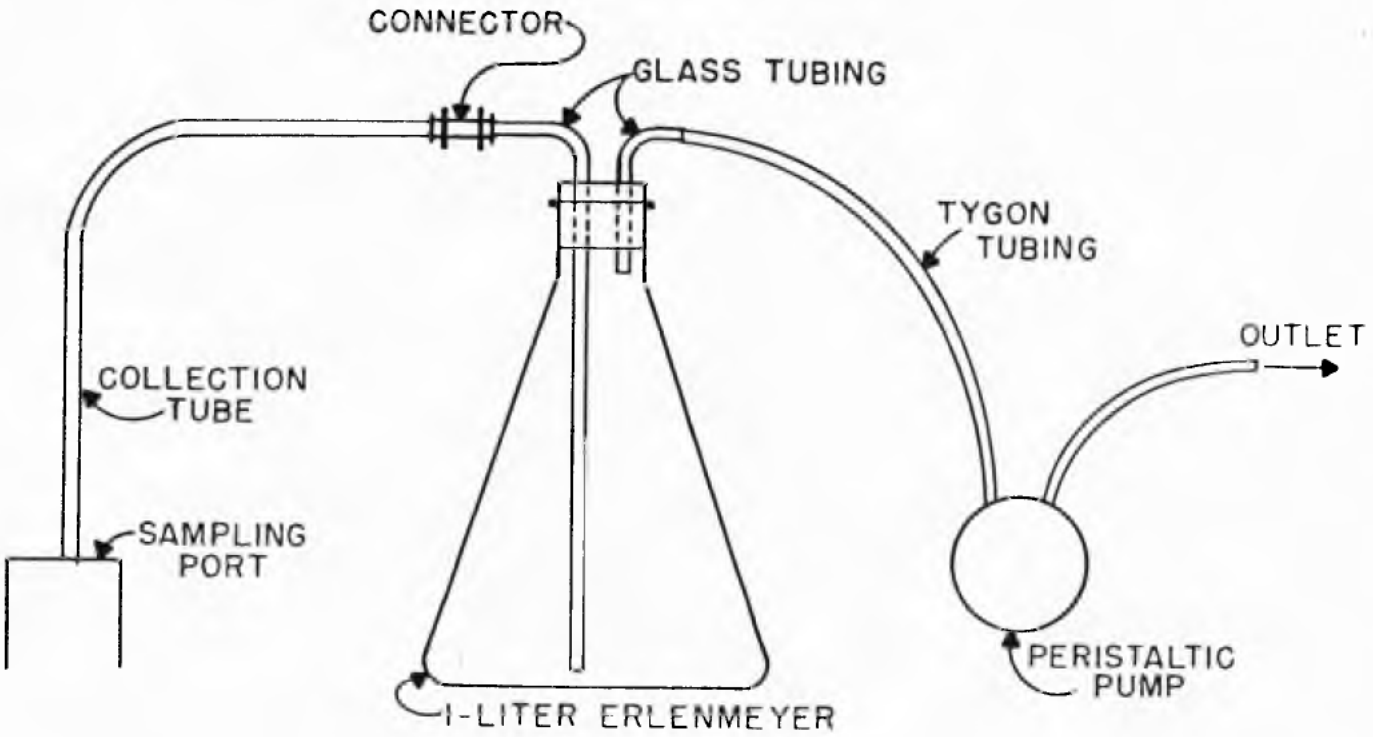
RBT SITE OPTION III
Cross - Sections

Figure 11

Revised 8/19/83

Figure 14

SAMPLING SYSTEMS



SOILS TESTING DATA

FOUNDATION ENGINEERING

18 July 1983

Sweet, Edwards and Associates, Inc.
P.O. Box 328
Kelso, Washington 98626

ATTENTION: Randy Sweet

Dear Mr. Sweet:

We have completed the laboratory testing you requested for the RBT site closure project in Longview, Washington. You provided us with two bucket samples of soil from the site. We understand that these soils are intended to be representative of soils which may be used as liner material during construction. The samples were identified as BH-1 (channel section from a depth of 0.5 to 5 feet) and BH-2 (composite sample from a depth of 4 to 10 feet).

Laboratory Testing

We ran natural water content and Atterberg Limits tests on samples of soil obtained from the buckets. The percent of fines (passing the No. 200 sieve) was also determined for both samples. A moisture-density curve (ASTM D-698) was determined for both soils to provide a basis for estimating the relative compaction of the permeability test specimens.

We ran eight permeability tests on specimens prepared from the soil provided by you. The specimens were compacted into 2.5-inch diameter by 1.0-inch long steel rings. We attempted compacting the specimens to densities similar to those anticipated during construction. The soil specimens were prepared with an initial water content close to or slightly wet of optimum. All samples were tested in a falling head permeameter with an initial head of approximately 4 feet. Individual tests were run over a period of two to five days, until a relatively constant permeability was attained. All tests were run using tap water at room temperature.

Summary Test Results

The soil samples provided to us consisted of brown to tan, friable, low-plasticity sandy silt. Table 1 summarizes the results of the natural water content and Atterberg Limits tests.

Table 1. Natural Water Content and Atterberg Limits Test Results

Sample Number	Natural Water Content (%)	Liquid Limited (%)	Plastic Limit (%)	Plasticity Index	USCS Classification
BH-1	25.2	26	20	6	ML
BH-2	28.0	30	22	8	ML

James K. Maitland PhD., P.E., 3930 N.W. Tillicum Place, Corvallis, OR 97330 503/757-7645

The Atterberg Limits fell very close to the "A" line on the plasticity chart and the soils could be classified as a low-plasticity silt or clay. We have chosen the ML (silt) classification.

Sieve analyses (wet washing) indicated that Sample BH-1 had approximately 68.3% fines (passing the No. 200 sieve). Sample BH-2 had approximately 81.7% fines. The fraction retained on the No. 200 sieve consisted primarily of sand-sized particles.

The moisture-density curves for the soils are enclosed. Tests indicate a maximum dry density (ASTM D-698) of about 103 pcf at an optimum water content of 20 to 21% for Sample BH-1. Sample BH-2 had a maximum dry density of about 100.5 pcf at an optimum water content of 21 to 23%.

Table 2 summarizes the results of the permeability tests. The initial degree of saturation of the specimens ranged from about 69 to 98%. We estimated, based on the final water contents, that the specimens were nearly 100% saturated during the tests.

Table 2. Permeability Test Results

Test Number	Sample Number	Initial Water Content (%)	Final Water Content (%)	Dry Density (pcf)	Relative Compaction (%)	Coefficient of Permeability (cm/sec)
1	BH-1	22.7	33.3	89.5	87	9.3×10^{-6}
2	BH-2	25.7	28.2	99.0	99	5.0×10^{-8}
3	BH-1	22.5	25.3	104.0	101	2.5×10^{-8}
4	BH-2	26.4	35.0	91.6	91	1.5×10^{-6}
5	BH-1	22.7	27.7	101.0	98	7.3×10^{-8}
6	BH-2	25.5	32.4	97.0	97	1.2×10^{-7}
7	BH-1	22.3	31.8	96.2	93	6.5×10^{-6}
8	BH-2	25.9	32.9	95.4	95	5.6×10^{-7}

Discussion and Recommendations

Sample BH-2 was less pervious than Sample BH-1 at similar densities or relative compactions. This observation is consistent with the higher percent of fines contained in Sample BH-2.

The coefficient of permeability for both soil samples was very sensitive to density. The permeability changed by about two to three orders of magnitudes within the range of densities equivalent to 90 to 100% relative compaction.

We recommend that the values shown in Table 3 be used in seepage analysis or design.

Table 3. Recommended Coefficients of Permeability

Relative Compaction (%)	Recommended Coefficient of Permeability (cm/sec)
90	1 to 4 x 10^{-5}
95	2 x 10^{-5} to 3 x 10^{-6}
100	2 x 10^{-7}

The actual values to be used in any analysis would depend on the actual soil used as a liner. The larger values should be used if the source of soil is unknown or if a mixture of both soils is used. In selecting these recommended values, we have increased the coefficients of permeability obtained from Table 2 by a factor of 5 to account for variability in laboratory test data and the potential variation in field densities.

Conclusions

It is our understanding that coefficients of permeabilities in the range of 10^{-6} to 10^{-7} cm/sec are required for your project. It is our opinion that it would be unfeasible to attain the above permeabilities using the two sources of soil. However, we believe that the permeability of both soils could be lowered substantially by using an admixture such as bentonite. We have, based on your verbal authorization, sent two samples of soil to American Colloid Company. They provide testing and design services for soil-bentonite liners. We anticipate receiving test results from them within one week and will contact you as soon as the results are available.

Sincerely,

FOUNDATION ENGINEERING

James K. Maitland, P.E.

JKM/dlr

COMPACTION TEST RESULTS

PROJECT NAME RBT Closure

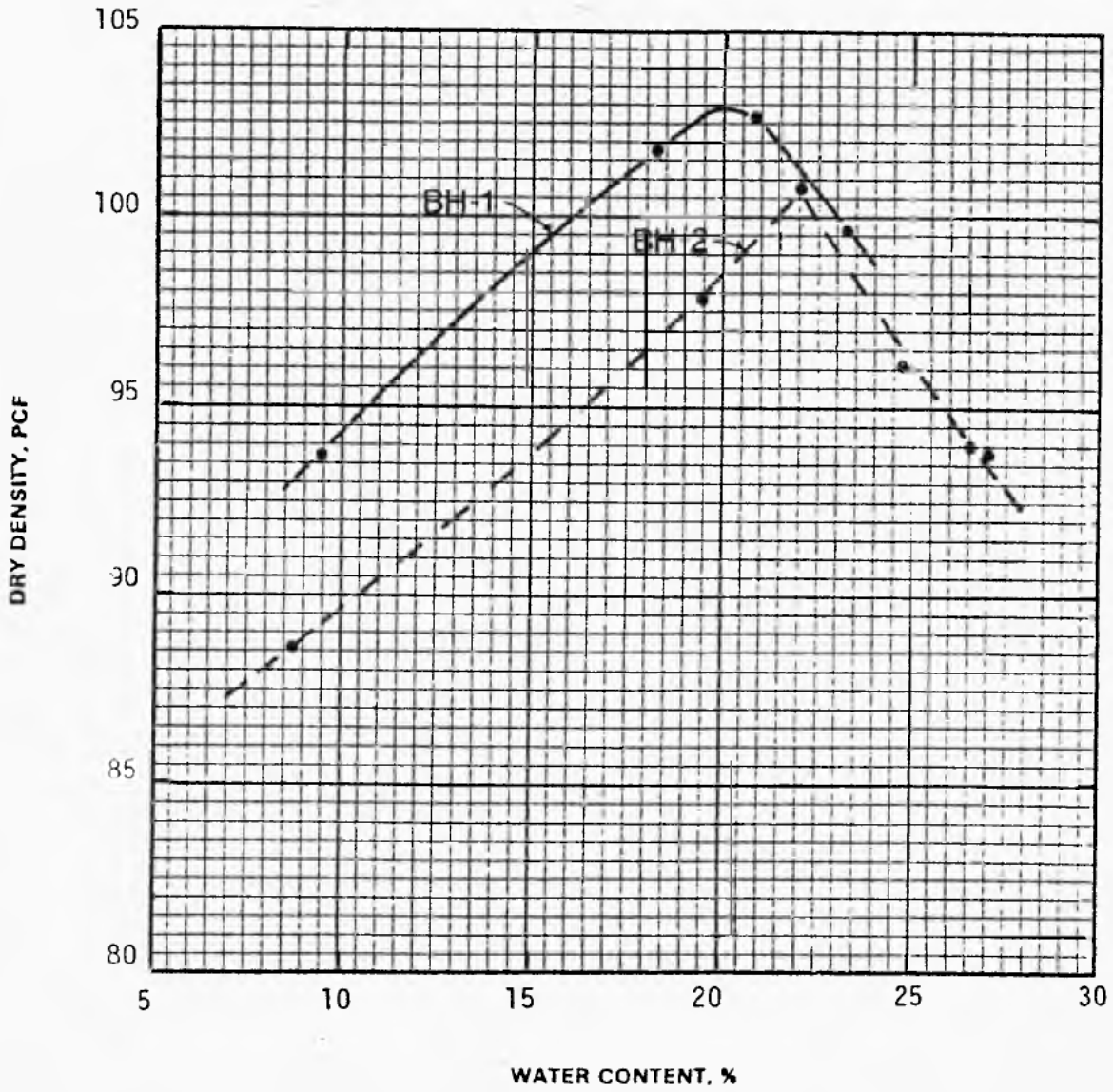
PROJECT NUMBER P-132 DATE 4 July 1983

SAMPLE DESCRIPTION Brown to tan, low-plasticity sandy silt

SAMPLE LOCATION BH-1 and BH-2

SAMPLE WATER CONTENT see report text TEST BY JKM

TEST METHOD	TEST RESULTS
☒ ASTM D-698 (AASHTO T-99)	MAXIMUM DRY DENSITY see below pcf
☐ ASTM D-1557 (AASHTO T-180)	OPTIMUM WATER CONTENT ____ %
☐ OTHER ____	SPECIFIC GRAVITY ____



FOUNDATION ENGINEERING

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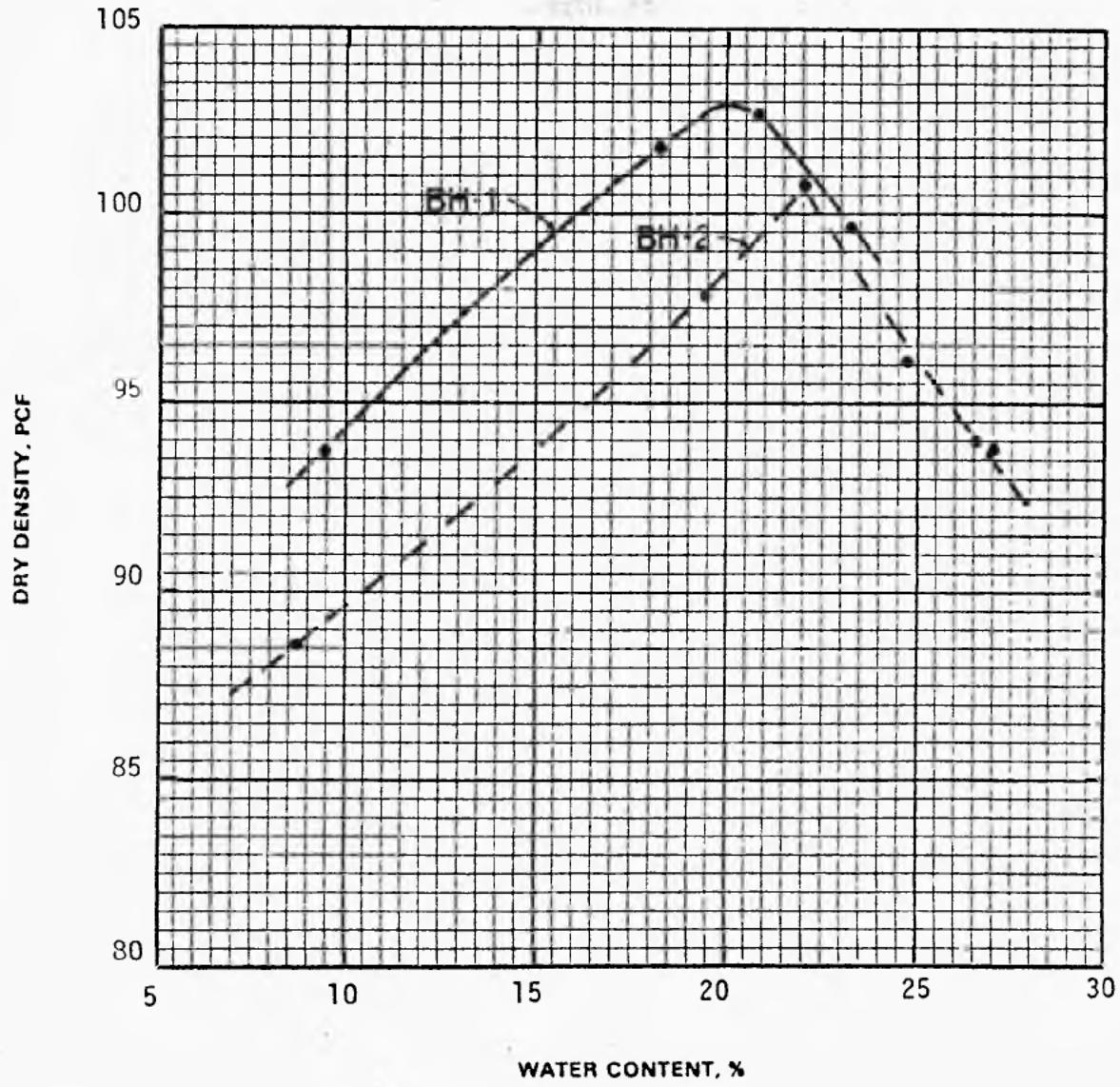
- ☐ ASTM D-1557 (AASHTO T-180)
- ☐ OTHER _____

TEST RESULTS

MAXIMUM DRY DENSITY see below pcf

OPTIMUM WATER CONTENT _____ %

SPECIFIC GRAVITY _____



FOUNDATION ENGINEERING

FOUNDATION ENGINEERING

2 August 1983

Sweet, Edwards & Assoc., Inc.
P.O. Box 328
Kelso, WA 98626

Project P-132

ATTENTION: Randy Sweet

RBT Closure

Dear Mr. Sweet:

We recently received the results of tests run by American Colloid on two samples of soil from the RBT site. American Colloid Company has recommended the use of their Saline Seal 100 grade bentonite (see enclosed test results). They have recommended an application rate of 2.5 lbs. of bentonite per square foot of liner area. The liner should be constructed as a 4-inch thick mixed blanket, compacted to at least 90% relative compaction (ASTM D-698) to obtain a coefficient of permeability of $1X10^{-7}$ cm/sec.

We have contacted the local representative for American Colloid. He indicated that the Saline Seal 100 would cost $207.00 per ton, delivered to the site. A less expensive bentonite ($135.00 per ton) could be substituted if only a cap is required for closure of the RBT.

We understand that you and your client are currently considering three options for closure. We would be happy to assist you with preparation of specifications for site preparation and construction of the cap and/or liner.

Please contact us if we can be of further assistance.

Sincerely,

FOUNDATION ENGINEERING

James K. Maitland, P.E.

jcm

Enclosure

James K. Maitland PhD., P.E., 3930 N.W. Tillicum Place, Corvallis, OR 97330 503/757-7645

AMERICAN COLLOID COMPANY

5100 SUFFIELD COURT
SKOKIE, ILLINOIS 60077

ENGINEERING REPORT
Soil Analysis

Date July 27, 1983

Sample Identification: SAMPLE #1 - BH-1
IND. WASTE LAGOON - LONGVIEW, WA.

Submitted By: FOUNDATION ENGRG.

Sample submitted is determined to have the following analysis:

% Retained on 325 mesh (wet screening)	44.3
Voids in Retained Soil	39.4
% Clay-Silt Fines passing 325 mesh	55.7
Voids Filled by Natural Clay-Silt Fines	37.8
Net Voids	1.7

The analysis indicates that the Volclay should be applied at a minimum rate of 2.0 pounds per square foot as a 4 inch thick mixed blanket compacted at optimum moisture to a minimum of 90% of Standard Proctor to attain a permiability coefficient of 1 x 10^{-7} cm/sec.

To compensate for mechanical imperfections in placement of material and minor variations in soil characteristics, a safety factor is included in the recommended application rate below.

$\frac{1 \times 10^{-8}}{2.4}$

RECOMMENDATIONS:

Recommended application rate is 2.5 lbs./sq. ft.

Recommended Grade: SALINE SEAL 100

3.0

Comments:

Lab Report No. 3307-1

Analyst M. Murray

DI:

SW:

SCI:

COND. 33

SAR 12-80

AMERICAN COLLOID COMPANY

5100 SUFFIELD COURT
SKOKIE, ILLINOIS 60077

ENGINEERING REPORT
Soil Analysis

Date July 27, 1983

Sample Identification: SAMPLE #2 - BH-2
IND. WASTE LAGOON - LONGVIEW, WA.

Submitted By: FOUNDATION ENGRS.

Sample submitted is determined to have the following analysis:

% Retained on 325 mesh (wet screening)	33.0
Voids in Retained Soil	42.1
% Clay-Silt Fines passing 325 mesh	67.0
Voids Filled by Natural Clay-Silt Fines	All
Net Voids	None

The analysis indicates that the Volclay should be applied at a minimum rate of 2.0 pounds per square foot as a 4 inch thick mixed blanket compacted at optimum moisture to a minimum of 90% of Standard Proctor to attain a permiability coefficient of 1 x 10^{-7} cm/sec.

To compensate for mechanical imperfections in placement of material and minor variations in soil characteristics, a safety factor is included in the recommended application rate below.

$\frac{1 \times 10^{-8}}{2.4}$

3.0

RECOMMENDATIONS:

Recommended application rate is 2.5 lbs./sq. ft.

Recommended Grade: SALINE SEAL 100

Comments:

Lab Report No. 3307-2

Analyst M. Murray

DI:

SW:

SCI:

COND. 26

SAR 12-80

BACKGROUND WELL LOCATION

No. Background

SWEET, EDWARDS & ASSOCIATES, INC.
WELL DATA

Project Pacific Wood

Owner (b) (6)
Address [redacted] RIDGEFIELD, WA.
Tenant
Address

State No. 4N/1E - 20 acd
Other No. 29

Type of Well: Hydrograph ☐ Key ☐ Index ☐ Semiannual ☐ Quality ☐
Location: County CLARK Co. Basin No.
U.S.G.S. Quad. Richfield Quad. No.
SE ¼ NE ¼ Section 20, Twp. 4, Rge. 1 Will. Meridian
Description

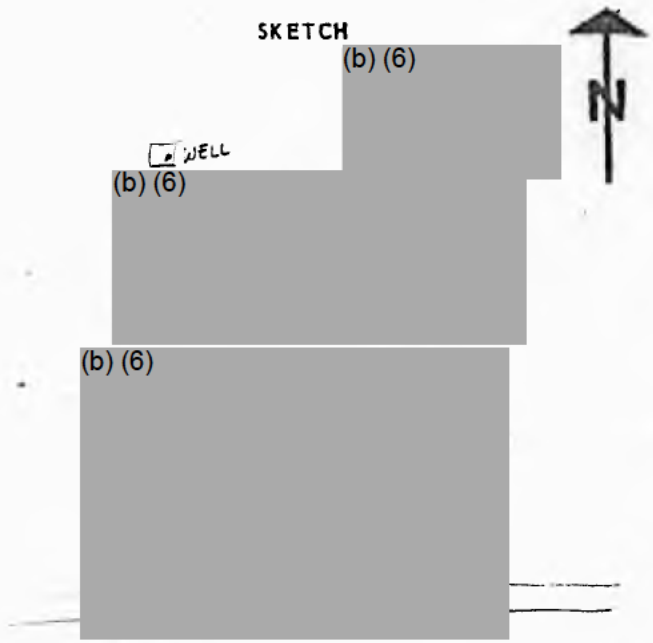
Reference Point description

which is 0.5 ft. above / below land surface. Ground Elevation 270 ft.
Reference Point Elev. ft. Determined from U.S.G.S. QUAD.
Well: Use DOMESTIC Condition IN USE Depth 283 ft.
Casing, size 6 in., perforations

Measurements By: DWR ☐ USGS ☐ USBR ☐ County ☐ Irr. Dist. ☐ Water Dist. ☐ Cons. Dist. ☐ Other ☐
Chief Aquifer Name Depth to Top Aq. Depth to Bot. Aq.
Type of Material Perm. Rating Thickness
Gravel Packed? Yes ☐ No ☐ Depth to Top Gr. Depth to Bot. Gr.
Supp. Aquifer Depth to Top Aq. Depth to Bot. Aq.
Driller
Date drilled Log, filed open (1) confidential (2)
Equipment: Pump, type make
Serial No. Size of discharge pipe in.
Power, Kind Make
H. P. Motor Serial No.
Elec. Meter No. Transformer No.
Yield G.P.M. Pumping level ft.

Water Analysis: Min. (1) San. (2) H.M. (3)
Water Levels available: Yes (1) No
Period of Record: Begin End
Collecting Agency:
Prod. Rec. (1) Pump Test (2) Yield (3)

SKETCH



REMARKS

D.T.W. 212.3', 8/21/83 - PUMPING LEVEL DURING PASTURE IRRIGATION

WELL HOUSE IS (b) (6) (b) (6)

Recorded by: [illegible]
Date 8/24/83

File Original and First Copy with the Division of Water Management
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. _____

Permit No. .... _____

(1) OWNER: Name (b) (6) Address (b) (6), Ridgefield, Wa

(2) LOCATION OF WELL: County Clark SE ¼ NE ¼ Sec 20 T 4 N., R 1 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....

New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☑ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 283 ft. Depth of completed well 279 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 264 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☑ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☑
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☑ No ☐ JOHNSON
Manufacturer's Name
Type Stainless steel Model No. 304
Diam. 6 Slot size 15 from 253 ft. to 223-8 ft.
Diam. 6 Slot size 30 from 223-8 ft. to 279 ft.
Riser-equals-5'-5", Screen=15'-11"

Gravel packed: Yes ☐ No ☐ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☑ No ☐ To what depth? 20 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name Sta-Rite
Type: Submersible H.P. 5

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 196 ft. below top of well Date 3/3/73
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☑ No ☐ If yes, by whom? Driller
Yield: 30 gal./min. with 24 ft. drawdown after 4 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
0:00	220'				
2:00	198'				
3:00	196'				

Date of test 3/3/73
Bailer test 15 gal./min. with 21 ft. drawdown after 4 hrs.
Artesian flow g.p.m. Date
Temperature of water 51 Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Topsoil	0	2'
Brown Clay	2'	21'
Brown, yellow and gray clay	21'	44'
Brown clay	44'	50'
Dark brown clay	50'	81'
Brown cemented sand with multi-colored clay seams.	81'	93'
Cemented brown sand & gravel	93'	134'
Cemented gray sand & gravel with scattered boulders	134'	184'
Cemented brown sand with clay binder	184'	247'
Dark brown cemented sand	247'	258'
Water bearing fine brown cemented sand	258'	273'
Water bearing coarse yellow sand and gravel	273'	279'
Brown clay	279'	281'
Blue clay	281'	283'

Work started 1/27 19 73 Completed 3/3 19 73

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Morris Drilling and Pump Co., Inc.
(Person, firm, or corporation) (Type or print)

Address 2009 NE 117th St., Vancouver, WN

[Signed] Patrick M. Morris
(Well Driller)

License No. 223 02 8129 Date March 5, 1973

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 5-69)—5-69.

7 MILES FROM POST PIT